REMARKS

The Examiner rejected claims 1-27 as obvious (35 U.S.C. §103) over Tanaka (U.S. Patent No. 5,542,064) in view of Arnon (U.S. Patent No. 6,493,796 B1). Applicants traverse these rejections for the following reasons.

On the pages 2-3 of the Final Office Action, the Examiner responded to Applicants arguments by citing new sections of the cited references, to which Applicants respond below. The Examiner also incorporated his previous grounds of rejection into the Final Office Action.

Claims 1, 10, and 19 concern accessing a data set from one of two storage devices, each including a copy of the data set. These claims require: maintaining a flag for each storage device indicating whether a previous access attempt of the data set from the storage device failed; in response to an access request to the data set, selecting the storage device having the flag indicating that no previous access attempt failed if the flag for the other storage device indicates that one previous access attempt of the data set from the storage device failed; and accessing the data set from the selected storage device.

In the Final Office Action, the Examiner cited new sections of Tanaka, different from those cited in the previous Office Action dated Jan. 15, 2003) ("Previous Office Action"), as teaching the claim requirement of maintaining a flag for each storage device indicating whether a previous access attempt of the data set from the storage device failed. In particular, the Examiner cited col. 2, lines 43-46 and col. 10, lines 37-44, FIG. 5 and FIG. 9 of Tanaka as teaching these claim requirements. (Final Office Action, pg. 2)

The cited col. 2 discusses a goal to provide a method for accessing identical data in a secondary storage device having storage units to make it easy to recover data in the case of a failure. Although the cited col. 2 discusses accessing identical data, nowhere does the cited col. 2 anywhere teach the claim requirement, that in response to an access request, a selection is made of one of two storage devices having the data set and whose flag indicates that no previous access failed when the flag for the other storage device indicates that a previous access failed.

The cited col. 10 and FIG. 9 of Tanaka mentions that when a failure occurs in any of the disk drives 16-1 to 16-n and drive processor 17-1 to 17-n, a flag indicating that the failed disk

cannot be used is set in an area also indicating a number of I/O commands to process for the disk drive, shown in FIG. 5, to forbid use of the failed disk drive.

Although Tanaka discusses the use of flags with disk drives indicating whether a drive failed, nowhere does the cited col. 10 of Tanaka teach or suggest the claim requirement that a flag is maintained for two storage devices that have the same data set and that in response to an access request, the storage device having the flag indicating that no previous access attempt failed is selected if the flag for the other storage device indicates that one previous attempt failed. Tanaka mentions that its flag is used to prevent someone from accessing a failed drive, but nowhere suggests the claimed use of the flag to select one of two devices having the same data set to access.

The Examiner further cited col. 14, lines 19-26 of Arnon with respect to the claim requirement that two storage devices include a copy of the same data set and that a flag is maintained for each storage device. (Final Office Action, pgs. 2-3) The cited Arnon mentions flags for each storage device indicating the state of the device as on-line, off-line, or pending off-line. Nowhere does the cited Arnon teach or suggest that in response to receiving an access request, flags of storage devices having the same data set are considered and the storage device having a flag indicating no previous access failure is selected when the other storage device flag indicates a previous access failure.

The Examiner also referenced the table discussed in Arnon accessible to the storage system. (Final Office Action, pg. 2) The cited Arnon mentions that a table may be stored in other locations accessible to the storage system. However, nowhere does the cited Arnon mention that the storage devices for which flags are maintained include the same data set that may be accessed.

Thus, although both Tanaka and Arnon mention flags with storage devices indicating a state of the storage device, such as failed, nowhere does the cited Tanaka nor Arnon teach or suggest, alone or in combination the use of such flags with storage devices having a copy of the same data set, and then considering such flags when selecting one storage device to use for the access. Further, nowhere do these cited references teach the claim requirement that the storage

device having a flag indicating no previous access failure is selected when the other storage device flag indicates a previous access failure. Thus, even if the references may be combined, they still do not teach or suggest all the claim requirements.

Applicants further submit that nowhere do the cited references teach or suggest the claim requirement, that in response to an access request, a selection is made of one of two storage devices having the data set whose flag indicates that no previous access failed when the flag for the other storage device indicates that a previous access failed. Although the cited references discuss flags indicating the state of a storage device, nowhere do the cited references, alone or in combination, teach or suggest that in response to receiving an access request, the flags are considered such that the storage device having a flag indicating no failure is selected when the other storage device flag indicates a failure.

For instance, col. 12, lines 40-50 of Tanaka discuss that when one disk drive fails, the data may be recovered from another disk drive. However, this cited section also nowhere teaches that the flags of Tanaka indicating drive failure are checked for two storage devices having the copy of the data to determine from which device to access the data.

Accordingly, claims 1, 10, and 19 are patentable over the cited art because the cited art, alone and in combination, does not teach or suggest all the claim requirements.

Moreover, with respect to all claims, Applicants incorporate the arguments from the previous Amendment dated May 15, 2003 to apply to the findings the Examiner repeated from the Previous Office Action.

Claims 2-9, 11-18, and 20-27 are patentable over the cited combination of art because they depend from claims 1, 10, and 19, which are patentable over the cited art for the reasons discussed above, and because they add requirements that in combination with the base and intervening claims from which they depend, further distinguish over the cited combination. Moreover, claims 2, 4-9, 11, 13-18, 20, and 22-27 provide additional grounds of patentability over the cited art.

Claims 2, 11, and 20 depend from claims 1, 10, and 19, respectively, and further require using a selection criteria to access one of the first and second storage devices that is unrelated to

a value of the flag if the flags for both storage devices have the same value. In the Final Office Action, the Examiner cited the same col. 9, lines 47-48 of Tanaka cited in the previous Office Action as teaching the additional requirement of these claims. (Final Office Action, pg. 6). Applicants traverse.

The cited col. 9 mentions that if the number of selected disk drives cannot satisfy the multiplicity, then supplements are selected from disk drives having data satisfying the conditions. Tanaka mentions that the multiplicity is the number of instances of identical data, where the number of disk drives should be larger than the multiplicity. (Tanaka, col. 5, line 38 to col. 6, line 5)

In the previous response, Applicants explained that nowhere does the cited col. 9 anywhere teach or suggest a selection criteria to access a copy of a data set from one of two storage devices that is unrelated to the flag for each device indicating whether a previous access attempt to the device failed. Further, the cited col. 9 does not teach the claim requirement of selecting a device in response to an access request for a data set having copies on two different storage device. Instead, the cited col. 9 concerns ensuring there are enough disk drives or other areas to write multiple instances of identical data. Nowhere does the cited col. 9 anywhere teach selecting one of two storage devices for an access based on the flag value and another selection criteria unrelated to the flag.

In the Final Office Action, the Examiner did not respond to the above arguments with respect to claims 2, 11, and 20, nor explain where the cited Tanaka teaches or suggests the claim requirement of selecting one of two storage devices for an access based on the flag value and another selection criteria unrelated to the flag.

Accordingly, claims 2, 11, and 20 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

Claims 4, 13, and 22 depend from claims 1, 10, and 19 and further require that a flag is maintained for each data set in the first and second storage devices and wherein the first and second storage devices have the same data sets.

In the Final Office Action, the Examiner repeated his findings from the Previous Office Action and cited col. 2, lines 26-29 of Tanaka as teaching the additional requirements of these claims. (Final Office Action, pg. 7). Applicants traverse.

The cited col. 2 mentions writing identical data to enhance I/O throughput of a secondary storage device having a plurality of storage units. In the previous response, Applicants explained that nowhere does this cited col. 2 anywhere teach or suggest providing a flag for each data set in the first and second storage devices having the same data sets, where the flag for each data set indicates whether a previous access to the data set failed. Instead, the cited col. 2 just mentions how identical data can be copied to different units in a storage device.

In the Final Office Action, the Examiner did not respond to the above arguments with respect to claims 4, 13, and 22, nor explain where the cited Tanaka teaches or suggests the claim requirement of providing a flag for each data set in the first and second storage devices having the same data sets, where the flag for each data set indicates whether a previous access to the data set failed.

Accordingly, claims 4, 13, and 22 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

Claims 5, 14, and 23 depend from claims 1, 10, and 19 and further require: accessing the data set from one of a third and fourth storage devices if the data set is in one of the third and fourth storage devices, wherein the steps of selecting one of the first and second storage devices and accessing the data from one of the first and second storage devices occurs if the data set is not in one of the third and fourth storage devices; copying the data set from the first storage device to the third storage device when accessing the data set from the first storage device; and copying the data set from the second storage device to the fourth storage device when accessing the data set from the first storage device.

In the response to arguments in the Final Office Action, the Examiner cited col. 9, lines 37-49 of Tanaka. (Final Office Action, pg. 3) The cited col. 9 discusses how a judgement is made as to whether the number of selected disk drives can satisfy the multiplicity. The

multiplicity refers to the writing of identical data to selected storage units. (Tanaka, col. 2, lines 61-67) The cited col. 9 further discusses how disk drives can be selected for the "multiplicity" or to receive the identical data. If the number of selected disk drives cannot satisfy the multiple writings, then supplements are selected from disk drives satisfying the condition.

Although the cited Tanaka discusses writing identical data to different disk drives, nowhere does the cited Tanaka anywhere teach or suggest the claim requirement that a data set is copied from a first to third storage devices or from a second to fourth storage devices when the data is accessed from the first or second storage devices.

Accordingly, claims 5, 14, and 23 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

With respect to claims 6, 15, and 24, the Examiner repeated his findings made in the Previous Office Action and cited col. 13, lines 48-56 as teaching the claim requirement of recalling the data set from the third storage device if the scheduled write operation has not yet copied the requested data set to the first storage device, wherein the steps of selecting one of the first and second storage devices to access the data set and accessing the data set occurs if the scheduled write operation of the data set to the first storage device completed. (Final Office Action, pg. 7) Applicants traverse.

The cited col. 13 mentions that keeping the CPU waiting for input commands through some disk drives can be eliminated to improve performance. Col. 13 further mentions that data to be recovered at time of recovery of a failure in any disk drive is obtained from identical data multiply copied in some disk drives so that the recovery can be written at any time. In the previous response, Applicants explained that nowhere does this cited col. 13 anywhere teach or suggest the claim requirement of recalling a data set from a third storage device if a scheduled write from the third to first storage device has not yet copied data, and that selecting one of the first and second storage devices to access the data set occurs if the scheduled write has completed.

In the Final Office Action, the Examiner did not respond to the above arguments with respect to claims 6, 15, and 24, nor explain where the cited Tanaka teaches or suggests the claimed sequence of events anywhere taught or remotely suggested in the cited col. 13.

Accordingly, claims 6, 15, and 24 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

Claims 7, 16, and 25 depend from claims 6, 15, and 24 and further require randomly selecting one of the first and second storage devices from which to recall the data set if the requested data set has been copied to the first and second storage devices as a result of the scheduled write operation and if the flags for both storage devices have the same value.

The Examiner repeated his findings made in the Previous Office Action and cited col. 13, lines 48-56 of Tanaka as teaching the additional requirements of these claims. (Office Action, pg. 5) Applicants traverse.

As discussed, the cited col. 13 mentions that data to be recovered at time of recovery of a failure in any disk drive is obtained from identical data multiply copied in some disk drives so that the recovery can be written at any time.

Nowhere does this cited col. 13 anywhere teach or remotely suggest that one of the first and second storage devices is randomly selected for the recall if the requested data set has been copied to the first and second storage devices and if the flags (indicating whether a previous access failed) have the same value. Nowhere does the cited col. 13 anywhere suggest this sequence of operations and determinations, i.e., randomly select if requested data copied and if flags have the same value.

Accordingly, claims 7, 16, and 25 provide additional grounds of patentability over the cited art because the cited combination does not teach or suggest the additional claim requirements alone or in combination with base and any intervening claims.

Claims 8-9, 17-18, and 16-27 are patentable over the cited art because they depend directly or indirectly from claims 5, 14, and 23 and for the additional limitations these claims

add, which in combination with the requirements of the base and intervening claims provide still further grounds of patentability over the cited art.

Conclusion

For all the above reasons, Applicant submits that the pending claims 1-27 are patentable over the art of record. Applicants submit herewith the fee for a one month extension of time. Nonetheless, should any additional fees be required, please charge Deposit Account No. 50-0585.

The attorney of record invites the Examiner to contact him at (310) 553-7977 if the Examiner believes such contact would advance the prosecution of the case.

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